

Forests for the Birds: Conserving America's Forest Birds Webinar Series - <https://training.fws.gov/topic/online-training/webinars/forest-for-the-birds-webinar-series.html>

Loss and Recovery of Forest Birds – Ken Rosenberg 3/16/21

Participation in the webinar was incredible and many questions were asked, but time constraints prohibited all the questions from being answered. Dr. Rosenberg hoped to address more of them, but his commitments simply did not allow time for additional follow-up.

The Forest Ecology Working Group (FEWG) is grateful for his webinar and time, and these follow-up answers are our group commitment to provide answers to your questions. These answers were developed by the following members of the FEWG: Haven Barnhill, Bob Ford, Jeff Horan, Jim Siegal and Chuck Hunter.

These answers are the effort of the group members above and are not intended to represent Dr. Rosenberg's opinion or position. Many of the questions are complex and challenging, and to reiterate one of Dr. Rosenberg's key webinar messages – "we do not know all the answers". We are sharing current knowledge and hypotheses, recognizing the critical need to better understand population dynamics, and limiting factors. As we learn more, bird conservation and management efforts should be refined in an adaptive framework.

Chat Questions/Answers – related questions have been grouped and answered together.

3 Billion Decline in Bird Populations

1. 3 billion birds obviously sounds like a lot... can that be expressed in terms of percentage of the total number of birds?
2. With 3 billion lost, what is the total abundance before and/or after decline?
3. Is there a good explanation for why some of these common species are declining?
4. I saw 85% of a common species were lost; any feel if that will tip a "common" species to a "rare" species?
5. Are other countries reporting losses on this scale? Any idea if there are similar losses on other continents? Are similar declines happening worldwide or is this mostly a North American bird issue?
6. How did you collect the data of how much these birds were declining, the numbers?

7. Are there periods over the last 50 years that we have seen the steepest declines in forest birds, or has it been a gradual loss?
8. How would one go about correlating population declines with habitat change? We have the habitat change data and survey data... what next?
9. Light pollution issues to?
10. Could vireos just be opportunistic... filling niches left by the species that have declined.
11. What if these are conservation reliant species, requiring species specific interventions to service? Is recovery a realistic goal?

Answer: The loss of 3 billion birds represents about 29% of the number of birds that were here in 1970. There are many reasons for widespread declines, some unique to a certain species group and other reasons may be common across many families of birds. Population decline, in the big picture, has been steady with no time period showing a significant up or down. There are places where a small change may be related to an event or policy (such as a small bump up in grassland birds soon after the Farm Bill started) but overall, steady declines. The most important reason is still habitat – the right configuration on the landscape, the amount and quality of habitats are important. Many species annual cycle stretches across the hemisphere, so understanding all the pieces is critical – at what point are they most vulnerable (or limited) and for what specific reasons – thus the work of Road to Recovery. Along the way, predators (domestic and wild), widows, light pollution, etc cause a high mortality rate of some species.

The definition of “recovery” can be different depending on context and objective. The Partners in Flight (partnersinflight.org) population objectives include goals to halt or reverse population decline over a set number of years (depending on multiple variables, including trajectory and knowledge of limiting factors), not to bring birds back to a historical benchmark. This is a more realistic approach to conservation objectives. So, status of a species as common to rare is subjective. It is unlikely that each species would have an Endangered Species-like recovery plan, but rather a conservation plan for habitats that includes latest knowledge about each species’ limiting factors and how to address those. Partners in Flight has long had a category of “Common Birds in Steep Decline” for example. The Breeding Bird Survey was the primary data source for this analysis, population estimates for landbirds can be found in the 2016 Partners in Flight plan (we will address PIF Plan in the 6/22/21 webinar), those and other species are also in the Avian Conservation Assessment Database, accessible through the Partners in Flight web site or directly at Bird Conservancy of the Rockies. More specific correlations with habitat change is developing at large landscape scales (local response to habitat changes can be done in independent studies). The Avian Knowledge Network and eBird are two such mega-databases that could be used for such a correlation.

The question of vireos is a good illustration of what we don’t know and how we may form hypotheses to find answers. It may indeed be they are more opportunistic than we realize in nesting or foraging needs, or it could be stem from multiple reasons acting together.

About the issue of conservation reliant species - We have entire ecosystems, their associated disturbance regimes, and their ecological succession pathways, that are "conservation reliant". The red-cockaded woodpecker and the Kirtland’s warbler depend on natural fire regimes that no longer occur.

There are huge areas of North America that are largely human dominated – both the highly developed agricultural and urban lands, and many more “wild” areas, reliant on everything from continuous white-tailed deer hunting to costly ongoing removal and control of exotic invasive species of plants and animals. Many of the so-called natural areas now rely on some form of resource management to sustain the native community.

Some species will require management, but this does not preclude us from making efforts to provide necessary habitat conditions to improve populations. The conservation of birds will require considerable long-term investments by our society. Birds provide essential ecological services and a myriad of other values to human existence and to the existence of other organisms. We could never pay for the ecological services they render us if they disappeared; we could go financially and materially bankrupt. We must acknowledge that we are living in the Anthropocene now. It is a “We Broke It, We Bought It.” kind of world.

“The conservation challenge is clear. The number of species that will require ongoing management is already large, and it will get larger as climate change, land-use change, human population growth, and other manifestations of the Anthropocene push more and more species to their limits. The Endangered Species Act has been an effective approach for recognizing taxa that are on the brink of extinction and defining the steps needed to reverse their downward trajectory. The need for continuing intervention, even for “recovered” species, was not anticipated. We now face the conundrum that building on our conservation success will require long-term investments.” Quote from Goble et al. 2012.

The Human Dimensions of the 3BB Decline, Bird Conservation Communications

12. What percentage of the US population do you think is aware of this bird decline?
13. Are there any plans to continue to engage the message to the public from ABC or other organizations throughout the US?
14. The numbers are so high, it can fly over the heads of most people (pardon the pun). The real key issue here is how do you get people to care? what is the loss when you lose these 10 large population species, for example. A picture must be painted for people, some analogy, or they just will not get it. Maybe more Project WILD or Flying WILD early and often in schools.
15. In addition to Rosenberg's bird report, and the catastrophic insect declines already mentioned, there is a similarly alarming report just out documenting worldwide freshwater fish collapses. https://wwfint.awsassets.panda.org/downloads/world_s_forgotten_fishes__report_final__1.pdf . I think the conservation community needs to weave these reports together into a compelling story about sustainability, and treating the lands and waters with respect and humility. Are we missing the opportunity of a lifetime to alert humanity of the path we are on as a species?
16. **Species on the Brink** is a great title to develop a social media plan around. Get Project WILD/Flying WILD to add some kind of lesson plans under this title. Incentivize the use of iNaturalist or other app for kids/adults to find these species and record them, etc.

Answer: The Bring Back 3 Billion Birds (BB3BB) science communications effort has been extensive, strategic, and coordinated across NGOs, so many of us on the US should know about it. It's hard to say a percentage. The difficulty of course is moving a passive knowledge to conservation action, thus the web site to Bring Back 3 Billion Birds (<https://www.3billionbirds.org/>) and a list there of "7 simple actions". We hope this webinar series increases awareness and action! As science techniques evolve, other uses of mega-data sets and ongoing field work may reveal widespread change. The challenge to communicating science will be apply it to people's lives. Some great thoughts here in that regard, hopefully others can pick up that ball (Project WILD, etc) and run with it!

Agricultural Practices, Pesticides, Industrial Agriculture

17. Pesticide use has declined in almost all agricultural sectors and their toxicities have dropped precipitously as well. *What evidence do you have to implicate pesticides?*
18. Can you elaborate on how (or which) agricultural practices have changed to drive some of these effects?
19. Has there been any discussions amongst the bird recovery team or Migratory Birds on how to address the effects of pesticides to avifauna?
20. Forest fires have been increasing over the last 30 years, but rufous hummingbirds are in decline. Is this due to pesticide spraying or are there other limiting factors other than wildflowers at disturbed sites that we need to consider more closely (e.g. breeding habitat).
21. Are there plans to do something along these lines for grassland birds too?

Answer: The agricultural pesticide questions are a complicated topic and generally beyond the focus of the Forest for the Birds webinar series and more detailed answers may be found elsewhere. That said, Rosenberg et. al. (2019) identified pesticides as a threat (direct and indirect).

Agricultural intensification is affecting birds via multiple pathways but likely led by the loss of natural habitats. Increased mechanization, changes in timing of agricultural practices, ag policy, and increased use of pesticides affect birds. Intensification has led to more food being produced per unit area, perhaps allowing other natural habitats to be retained. Some agricultural policies (e.g. ethanol supports) may be negatively impacting habitat by supporting increased commodity production, while others (certain USDA conservation programs) positively affect habitat. Even among members of the FEWG, there is disagreement as to whether pesticide toxicity is a major driver of population declines in the agricultural sector. In the Prairie Potholes and Mississippi Alluvial Valley, areas of the country with very significant agricultural impact and heavy pesticide use, breeding bird survey population trend data, especially since 1993 when the present suite of pesticides came into broad use, demonstrate stable or increasing trends for almost all species most likely to be regularly exposed to pesticides in agriculture and associated wetland habitats.

Households and agriculture are major users of pesticides, while forest management is an important but relatively minor user of pesticides. Though data appears scarce, it is estimated that forestry pesticide application is roughly 10% of pesticide use in the U.S. The effects of herbicides in forestry varies. They can be important tools to eliminate invasives or restore critical habitats. They can also change forest

structure and composition, potentially negative for some species. Indirect effects (changes in habitat quality) may be more important to bird conservation. Although not common, some pesticides are used to control forest pest insects (e.g. gypsy moth treatments) and certain area treatments have been demonstrated to reduce overall abundance of native insects potentially available as food for forest associated birds.

Forest Management, Clearcutting, Deforestation, Fire and Forests

1. Clearcutting results in temporary forest fragmentation in N. Maine, how does this impact bird habitat need?

Answer: The simple answer is it depends. Disturbances, including silvicultural practices, have varying impacts depending on scale (size of disturbance) and landscape context (is it the only patch in the landscape, or is the landscape dominated by recent clearcuts, or is the landscape dominated by non-forest land use such as agriculture and/or residential development) and what bird species are of concern. Relative to clearcutting, resulting habitat will initially favor early successional species and is more likely to adversely affect species needing mature forests or closed canopy conditions where clearcutting can result in a net loss of habitat for those species. Conservation practices that influence the size, shape, and arrangement of clearcuts (or other silvicultural activities) and retain legacy and critical habitat components within an ecosystem can improve the resulting habitat quality for some bird species. Sometimes clearcutting is used to establish monoculture forests (plantations) which may not support the same suite of species that mixed forest stands support. Relative to fragmentation, predation and nest parasitism are concerns and landscape context is important. Thompson et. al. (2002) did not find evidence in eastern forests that fragmentation of mature forests by young forests created the type of negative effects that fragmentation by agriculture or developed land uses do (see https://www.nrs.fs.fed.us/pubs/book/nc_2002_thompson_001.pdf). Avoiding conversion to non-forested conditions is important to minimizing fragmentation effects.

2. Are bird populations lower in the remaining forests, or is the loss all due to loss of forest habitat?

Answer: Pre-European settlement the U.S. had about 1,023 million acres of forest land. Most clearing and conversion to non-forested areas occurred by 1910, when 754 million acres of forests remained in the U.S. Since then, forested acres have been relatively stable with about 741 million acres currently being forested. Much of the bird decline has occurred while total forested acres have remained relatively constant. The issue is more complex, as forest types and conditions have changed – more acres of plantations, more acres of dense forests than historic conditions. Just because it is forest, doesn't make it great for all birds. Awareness of specific habitat needs for species of conservation concern is important, and knowledge of how to create and sustain desired forest conditions is essential. Some migrant species trends may be driven by issues outside the breeding season (migratory and wintering habitat).

3. If forest mgt on breeding grounds is one of the limiting factors, how would you address the pro-forestation movement and activists who fight forest management for birds in the name of maximizing carbon storage to counter climate change?

Answer: Use good science to make informed decisions, share accurate facts and look for opportunities to support conservation without conflict. Active forest management can be used to increase carbon sequestration rates (young, vigorously growing trees can sequester carbon at higher rate but are often smaller trees, thus they store less carbon). Also, maximizing any single resource, be it fiber, carbon, or a specific bird species, may not result in the most healthy and sustainable ecosystems. The absence of management may increase catastrophic risks (e.g. wildfire, pests) in some forests, and limit options to respond to threats like climate change. Hence the need to consider the full range of ecosystem services desired when managing forests (or not managing them) and understanding the trade-offs from decisions made.

4. Is there guidance from FWS on forest management actions for these species? i.e. TSI treatments that assist in habitat development

Answer: Depends on species and area, but the USFWS has developed guidance for forest management for some habitats and/or species (e.g. recovery plans). An example for bottomland hardwood forests is here: <https://www.lmvjv.org/desired-forest-conditions/> The USFWS Forest Ecology Working Group list serve is a great community of practice to ask specific management questions. FWS employees sign up here: <https://www.fws.gov/lists/listinfo/forestecology> (thru PULSE SECURE) and non-FWS persons can email Jeff_Horan@fws.gov to sign up of the FEWG Listserve

5. I'm a NRCS soil conservationist who commonly plans forestry practices in the Boundary and Bonner counties Idaho (the two most northern counties in Idaho). Is there two-three major things I can do in my forest planning to mitigate bird decline?

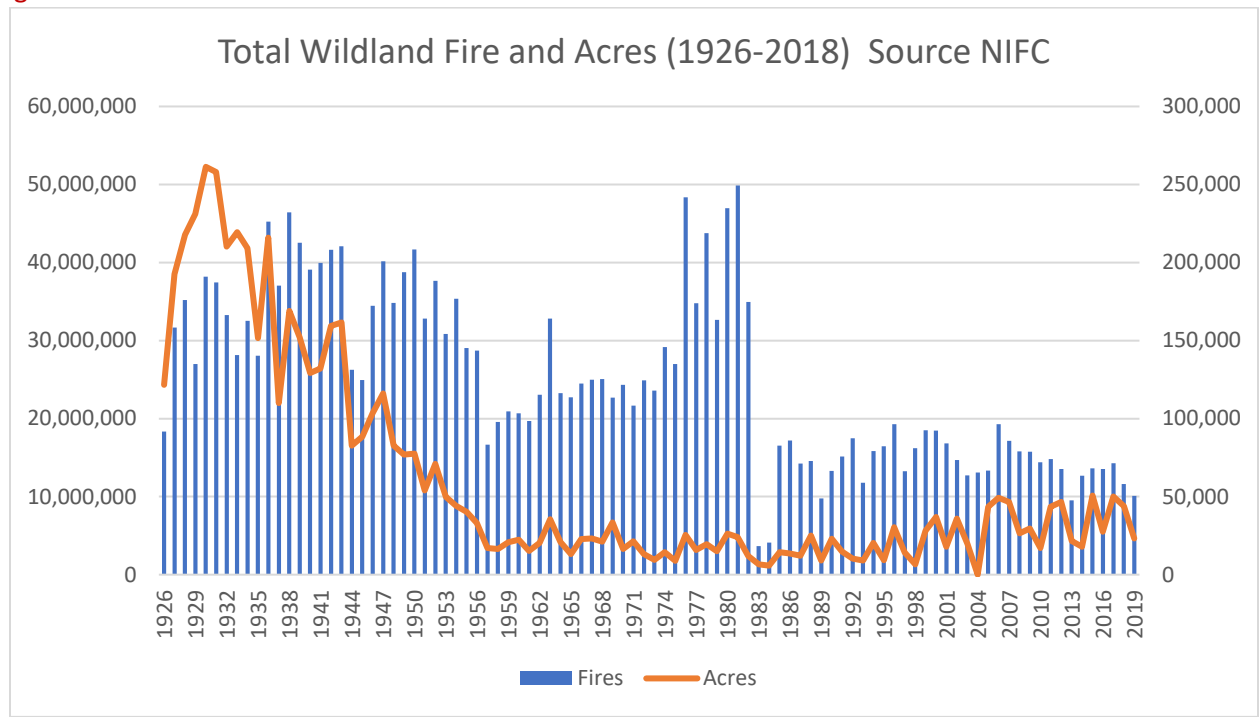
Answer: There is not a simple process or recommendation as it depends upon current condition and species of conservation concern. In general, management that mimics the normal range of variation occurring from natural disturbances and ecological processes across the landscape may provisions appropriate forest structure and composition for many species.

6. Glad to see "forest" includes PJ – does it also include Juniper Savanna?

Answer: Depending upon the definition of "forest" you choose to use, Juniper savanna and pinon-juniper woodland communities can be considered "forests". Forests are usually defined by tree density, patch size and land use. The USFS describes forests as being at least 1-acre in size and has at least 10% tree cover (or had tree cover and is capable of re-growing trees) and is at least 120' wide.

7. Forest fires have been increasing over the last 30 years, but rufous hummingbirds are in decline. Is this due to spraying or are there other limiting factors other than wildflowers at disturbed sites that we need to consider more closely (e.g. breeding habitat).

Answer: Numerically, forest fires have not increased in the past century, but recent fires have become very large and severe. The graph below highlights the changing frequency of fire since 1926. See: <https://westernhummingbird.org/habitat/> for great information on status, management and threats to hummingbirds in the western U.S.



Climate Change

1. How do you address the challenge of the changing and eventual disappearance of entire biomes (due to climate change) that those declining species rely on for survival?

Answer: The human management response to climate change can be adaptation or mitigation. Mitigation of impacts may include for example, building a stronger seawall as compared to moving a neighborhood (adaptation). Mitigation may be necessary for some species but is probably a short-term solution (such as in the Florida Keys). For adaptation, basic principles of conservation biology and landscape ecology may offer pathway to guide climate change adaptation management. Example may be to provide natural corridors north-south and east-west continent wide so that sedentary species that make up the building blocks of natural communities may have ability to move and adapt over time. Entire biomes will disappear and change (already are) and there will be consequences for many species, including birds. Managing for healthy forests should help support resistant and resilient ecosystems.

Wild Bird Food, Bird Feeding

8. Any information in context to bird food quality shortage?
9. Have you considered the work done by Doug Tallamy in regards to the loss of native plants that are food sources for caterpillars?
10. In Maine, we've seen a huge decline in insects. Are any at risk birds tied to that decline?

11. Where do you come down on feeding birds vs. letting them forage on their own?
12. Have you also considered earthworm impacts on forest understory birds as well as the forage impacts when earthworms that consume all the forest duff and leave behind no seedbed for spring ephemeral plants.
13. Which bird species could be linked to monarch declines?

Answer: There appears to be a decline of some flying insects (ranging from bumblebees to butterflies and moths) in many areas of the U.S. and other parts of the world. Klink et. al. 2020 (<https://science.sciencemag.org/content/368/6489/417>) found variability in changes in insect abundance – increase in freshwater insect species and decrease in terrestrial insects (at a lower rate than some studies have reported especially within agriculturally dominated landscapes). The decline in some insects, most thoroughly noted in Europe, correlates with urbanization, industrial development, industrial and agricultural pollution, industrial agriculture, pesticide use, light pollution, and climate change. Since almost all songbirds feed their nestlings insects, changing insect availability (abundance or timing) could have significant impacts on songbirds.

The 3 Billion Bird Decline is not a problem that can be solved by putting up millions of bird feeders, dispersing bird seed and suet cake. Birdseed feeding does seem to have a positive impact on populations of some wintering seed-eating birds, including birds that can adapt to urban/suburban conditions, such as Northern cardinals. Identifying limiting factors for birds and addressing those factors is key.

Invasive species, including exotic invasive European and Asian earthworms, are serious causes of ecological degradation. It is not clear how the decline in the accumulation of the organic soil layer due to these worms is impacting the entire forest food web – from soil fungi to invertebrates up to songbirds and mammals. There are no known methods for controlling invasive earthworms on a large scale in most natural settings. Chemical treatments that would kill earthworms may harm beneficial soil organisms as well. Like many other forest invasives, earthworms are likely here to stay and we will have to learn to control and manage them as new members of the American forest community. The introduction of exotics, including earthworms, is an expanding forest problem and much effort is being directed towards control of invasives in forests.

It is not clear if any songbird declines are correlated with the decline in Eastern or Western populations of monarchs. However, some of the same environmental pressures that degrade or destroy habitat which affects monarchs and songbirds.

Avian Disease

1. Do we know much about bird diseases and could novel pathogens be at the heart of some of these declines (like we see in bats, amphibians, etc.)?
2. Was West Nile Virus assessed as potential driver in any species? (Combines Ag issues and CC as factors driving WNV prevalence even in remote forests)
3. Reading about bird deaths in the paper is one thing but Texans are outraged by finding dead Pine Siskins at/near their feeders this winter. There's reportedly a salmonella outbreak. Do we

know much about bird diseases and could novel pathogens be at the heart of some of these declines (like we see in bats, amphibians, etc.)?

4. Impacting pine siskins more than anything else. My agency ran a (late-to-the-game) press release on March 8th and followed that up with a new iNaturalist project for folks wanting to report sick or dead siskins. If this is a widespread issue for siskins, it will be additive to their already 80% continental decline per page 113 in the 2016 PIF Plan.

Answer: New (and old) diseases and pathogens- for some songbird species newly introduced avian diseases are a known factor in population declines - Hawaiian songbirds are severely threatened by introduced avian malarias, and West Nile virus did kill lots of crows, jays, robins, hawks and other medium to large-size birds with some recovery later noted. So, some novel and long-established wildlife diseases may be one factor explaining some of the declines of a few songbird species.

Mammalian Predators

I live in the Willamette valley, and we noticed a decline in birds when the opossum arrived in the late 60's. Do you see this as a source of ground bird decline?

Answer: The opossum arrived in NW Oregon in the 1910-20's brought by people traveling west. Opossums have also been introduced to many parts of California, where it has become well established in urban and agricultural areas. Yes, range extension of new opportunistic species into an area not adapted to that can cause problem. Yet, the decline of ground-nesting birds on the West Coast cannot be simply blamed on opossum introduction over at least 100 years. The decline in ground nesting birds in Oregon is based on multiple factors (including the loss of grassland habitat) rather than a single issue and the opossum is likely one contributing source.

Bird Priority Species Lists, Prioritization Process, Umbrella Species

2. Is there an umbrella species for each of these areas that we can focus for, for instance their breeding is from May to Oct, so it will be advised to reduce forest/land management during those timeframes to reduce chance of take or flushing them out during their breeding times?
3. Where can we find these priority species? Is this list found on the PIF website?
4. When will the BCC list be updated?
5. Is there place we can go to find out which species are declining in the different forest types?
6. Where can we access this list/data for all species in the 3B bird decline and species priorities? And which have recovery plans?
7. Pinyon jay, for example, isn't listed as a sensitive species in USFS R2- how do you get these species that are in decline, including the rufous hummingbird, added to this list? Also p-j removal tends to target early-encroachment to retain sagebrush shrublands- not sure how that could contribute to pinyon jay declines- would it interesting to see a map parsing out the projects that are actually removing woodlands vs. targeting early encroaching p-j.
8. Can you flip the table and say which habitat variables can be conserved to aid the greatest number of species? We need to give people without sophisticated training tools to contribute

to landscape scale management from stand scale decision-making. Do you recommend habitat messaging or focal species messaging?

9. Congress appropriates money for State of the Birds implementation projects each year. How do you think we could best prioritize what types of projects or species should receive funding?
10. At what scale should priority species be selected? Should there be regional and subregional species of concern? For example, in coastal forests of the PNW, there are distinct drivers of population declines that are distinct from either great basin or dry forest avifauna threats.

Answer: Priority landbird/forest bird species are included in the Watch List table in the 2016 Partners in Flight Landbird Conservation Plan which can be downloaded from the website (partnersinflight.org). The USFWS Birds of Conservation Concern list should be out within a few weeks. The two lists are very similar for forest birds and both are structured in a similar way, including Bird Conservation Region lists. The Partners in Flight plan presents this in a table which includes habitat type and vulnerability assessment based on various categories. The plan also includes a breakdown by each Bird Conservation/Joint Venture geography to determine which species occur in that area. The combination of two metrics, the half-life of a species (how long before its population drops by half) and area importance (the percent of the breeding population within that geography) can be one way to prioritize species locally; such as a short half-life (population decline by 50% in 20 years or less) combined with a high percent of breeding population (> half the population breeds on that geography).

Many of these and other species can be used as focal species or umbrella species, depending on the objective of what you want to learn by monitoring or managing for that species. Often, migratory bird Joint Ventures will set those umbrella species for a partnership, so check with the Joint Venture of their geography. Each organization (such as USFS – Region 2) has to define which species make it onto a “sensitive list”. However, for federal agencies, we hope that others will use the Birds of Conservation Concern as a primary driver. It is important to recognize that every species has unique habitat requirements and managing for one species does not ensure all habitat needs for other species will be met.

FWS Guidance

1. Can the FEWG working group develop guidance for the Service's ES offices to use when consulting on projects in forest bird habitat? We make conservation recommendations in our biological opinions, and we may be able to encourage applicants and/or Federal partners to implement practices that help these declining species.

Answer: Guidance and recommendations vary by species, current and desired conditions, project impacts, etc., so it is unlikely the FEWG could develop useful guidance to inform project consultation. However, the FEWG may be able to help connect field offices with local experts and existing resources. Also, the FEWG Listserve is a great avenue to ask questions The USFWS Forest Ecology Working Group list serve is a great community of practice to ask specific management questions. FWS employees sign up here: <https://www.fws.gov/lists/listinfo/forestecology> (thru PULSE SECURE) and non-FWS persons can email Jeff_Horan@fws.gov to sign up of the FEWG Listserve. Most importantly, the FEWG continues to build training (e.g. Intro to Forest Ecology and Management course at NCTC and webinar series), to help existing FWS employees become more informed about forest ecology and management.

2. What is your best advice for state agencies to better engage in this new approach to bird conservation and management?

Answer: Building upon existing partnerships and personal relationships is the best way to engage partners from other agencies including States. Understanding opportunities and constraints, finding common ground, and effectively sharing information is essential.

Wetland Birds

5. Do you think the increase in wetland bird populations is related to wetland habitat conservation and restoration legislation?
6. Any idea why wetland habitat types might have shown an increase in bird species, given the great loss of wetlands that is occurring in this country?
7. Could the increase in certain birds be due to low populations initially that were brought back to normal levels?
8. Can you talk more about the tradeoff between funding waterfowl (eg ducks) and non-game bird conservation in the US?

Answer: The increase in wetland bird populations is likely connected to habitat conservation and restoration legislation, starting with the “no net loss” policy that got the public’s attention and highlighted the importance of wetlands to every citizen. The effect of incentive programs shouldn’t be underestimated – incentive programs may help set a new paradigm for management in an area. It’s hard to say why wetland bird population are increasing, although loss or degradation of wetlands continues in many areas. Farm bill policy has helped ensure the quality and distribution of existing wetlands work better for birds in some areas, or as in the prairies, wetlands are protected as a grassland-wetland complex. The resulting habitat are productive nesting areas for some species. The Partners in Flight plan is focused on trends – to simply halt or reverse precipitous population declines is the primary objective. The hunting community has supported (via both funding and policy) practices that successfully improved breeding habitat for waterfowl. These practices also benefit non-game birds and other species of conservation concern. Additional funding is needed to support management of other species (e.g., forestland and grassland species).

Raptors

9. I'm surprised raptors are increasing just because I hear about the threats of bioaccumulation from rodenticides leading to raptor decline. Are there any specific reasons why they are increasing?
10. This question might be too specific- but we tend to focus on raptor nest protections on my forest at least; could there be indirect protections to nearby nesting passerine forest birds within those protective no-disturbance raptor nest buffers (generally 30-acres)?

Answer: Habitat changes affect species differently. Some raptors may be better accommodated to major land use changes like agriculture and urbanization than others. Red-shouldered and red-tailed

hawks and a few species of owls, both big and small, can live in agricultural, suburban, and even urban areas, feeding on prey that are either tolerant or that are even commensal with humanity. Bald eagle numbers have rebounded with protections and restrictions in highly toxic pesticides (e.g. DDT). Peregrine falcon numbers have expanded due to reintroductions and eyrie protections. Black vultures have expanded their range northward for a variety of factors and can be common in some rapidly developing suburban areas. Yet, there are still threats to many raptor species (e.g. lead ingestion from feeding on hunted animal carcasses). Some common raptors such as American kestrels are declining in many parts of the U.S.

Protections of large forest buffer zones for northern, California and Mexican spotted owls, northern goshawks, and other forest raptors should benefit songbirds living within those buffer zones. However, we cannot count on forest raptor nest protections to conserve enough forest in the desired successional condition to recover many forest songbirds.

Gallinaceous Birds

Were Grouse and Turkeys combined for purposes of analysis?

Yes

Captive Propagation

3. For species on the brink, aquatic biologists have used artificial propagation to save species while the causes of decline are being addressed. Are there propagation programs for birds or are they any plans to stand up propagation programs?

Answer: For a few species, captive propagation has been attempted, but only for very, very critically endangered species - down to the last few individuals. The dusky seaside sparrow of Florida, Marianas crow, Puerto Rican parrot, whooping crane, etc. The dusky seaside sparrow eventually went extinct, the crow, an island endemic from Rota Island in the Pacific, has done a little better, but still critically endangered. Captive propagation is expensive and difficult and alone does not necessarily address the cause of decline. Focus should be on overcoming limiting factors.

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